

Annex J

Investigation Report

Annex J1

Investigation Report – December 2019

Investigation Report of CEMS Exceedances

Date	1 - 31 December 2019
Time	Continuous monitoring throughout December 2019
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Cogeneration Unit (CHP) Ammonia Stripping Plan (ASP)
Exceedance Description	<ol style="list-style-type: none"> Continuous monitoring was carried out at the CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version F) for CAPCS, CHP and ASP respectively. The concentration of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including: <ul style="list-style-type: none"> • NO_x and SO₂ in the CHP • NO_x and SO₂ in the ASP. According to the Contractor, the plant was receiving around 100 tonnes of SSOW daily and was operated normally. Further optimisation of the chemical dosing system of the ASP. The Contractor explained that the exceedances recorded in the ASP was because the thermal combustion unit of the ASP still require tuning to optimise the combustion efficiency.
Action Taken / Action to be Taken	<ul style="list-style-type: none"> • It was arranged with the supplier of CHPs to check the performance of CHPs onsite during the reporting period. The supplier will conduct a detailed investigation of the remaining exceedance recorded on the CHPs. After the investigation, the Contractor will perform the maintenance work according to suggestions raised by the supplier. The maintenance work is expected to complete in the next reporting period. • Parts of the modification works on the ASP has been completed, with more components waiting to be delivered to Hong Kong. The Contractor has scheduled the remaining modification work for the next few reporting periods with schedule shutdown of the ASP to facilitate the installation of equipment for performance optimisation.
Remedial Works and Follow-up Actions	The Contractor is recommended to closely monitor the processes, including the modification work and follow-up emission monitoring of the ASP to avoid exceedance. MT will carry out follow-up audit regarding the progress next month.

OSCAR Bioenergy Joint Venture
EP/SP/61/10 – Organic Resources Recovery Centre Phase 1

Prepared by: Bonia Leung, MT Representative

Date 11 January 2020

Investigation Report of Intermediate Digestate Tank Leakage

Date	28 December 2019
Time	10:00 am
Monitoring Location	Intermediate Digestate Tank (IDT)
Parameter	IDT level
Exceedance Description	Suspension liquid overflow from the intermediate digestate tank (IDT) to the surface channel inside AD tanks farm was observed on 28 December 2019. The digestate spilled into the storm water discharge channel, and subsequently into the nullah.
Action Taken / Action to be Taken	The Contractor arranged clean-up of the spillage in the nullah immediately and stopped the suspension liquid of the IDT from overflowing. The Contractor found that the programme that controls the IDT was not functioning properly resulting in the overflow of digestate at the IDT. In addition, the 3-way valve near the IDT was open which did not stop the spillage from entering the storm drain system.
Remedial Works and Follow-up Actions	The Contractor monitors the IDT level closely using CCTV, enhanced the routine patrol on the IDT and closed the 3-way valve to prevent possible leakage to the nullah.

Prepared by: Bonia Leung, MT Representative

Date 11 January 2020

Extract of the Incident Notification Form on Suspension Overflow at IDT Prepared by the Contractor

Description of the Process

Intermediate Digestate Tank (IDT) is a 30m³ buffer tank to transfer digestate to the duty centrifuge use. The IDT is provided with liquid level measurements to detect the hydrostatic pressure at the bottom. The second level sensor detects the fill level by radar at the roof area. The digester recirculating / transfer pumps are inhibited by high level in the IDT.

IDT automatic operation is controlled through SCADA. When dewatering operation finishes (the required volume of digestate is processed) the digestate feed pump stops and the duty centrifuge stops after going through a ramp down sequence according to its programmed procedures. Afterwards, a back-flushing cycle of digestate feed pipe can be carried out automatically or manually to clear digestate off the pipeline to avoid release and accumulation of biogas gas within pipelines.

Description of the Incident

On 28 December 2019 morning at around 10:00 am, some black water was found discharging slowly to the nullah from the storm water discharge outlet. Investigation was carried out immediately and found that suspension was passing from the 3-way gate valve near AD3.

There was an incident happened in the early morning (around 08:30am). Suspension was overflowed from the IDT to the surface channel inside AD tanks farm (Figure 1). OSCAR was carrying out cleaning work inside the tank farm. OSCAR had checked the discharge outlet at around 9:30 and did not find any leakage at that moment. OSCAR also kept monitor the outlet by using CCTV. The 3-way gate valve was believed fully closed and the team did not aware suspension would pass through the 3-way gate valve.

Immediate Corrective Actions

The team immediate put sandbags at the stormwater discharge outlet to block the leakage. OSCAR also arranged a vacuum tanker truck immediately to clean up the suspension at the nullah (Figure 2&3). Cleaning work for the spillage inside the tank farm, nearby surface channel and around the IDT was also completed at around 4:00 pm (Figure 4).

Photo.1 Overflow of Suspension from IDT



Figure.2&3 Sandbags was put at the discharge outlet and Vacuum tanker truck was arranged to cleanup

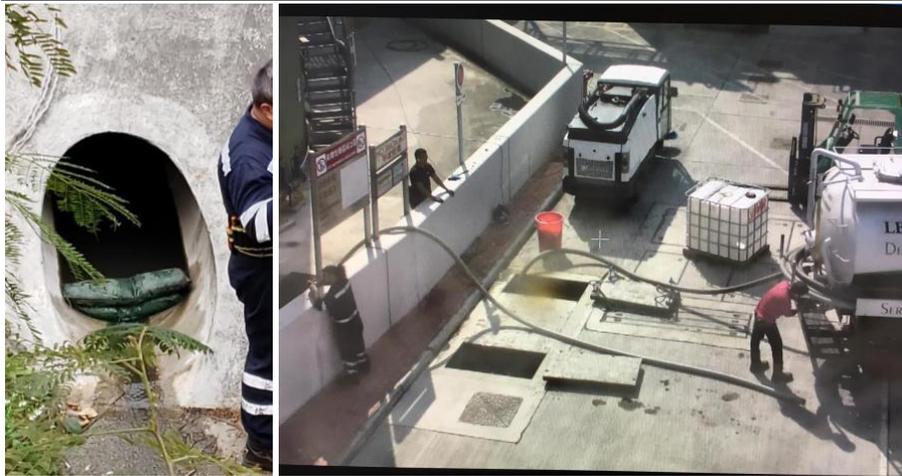


Figure.4 Completed cleanup of tank farm and nearby surface channels



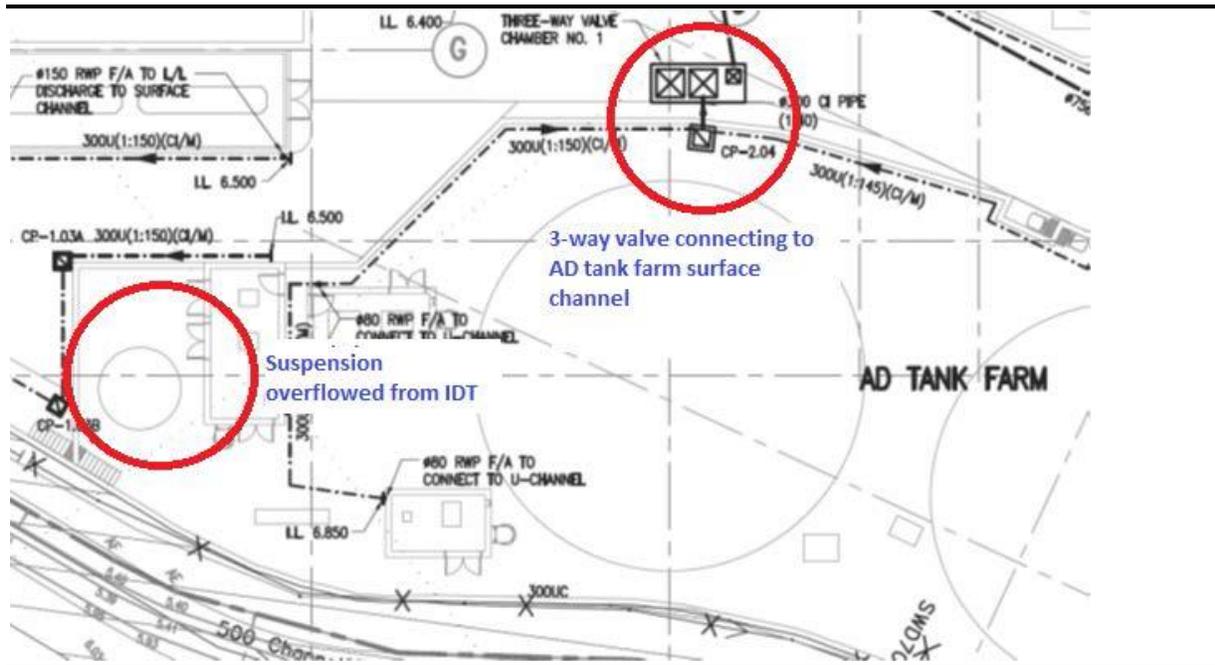
Figure.5 Dye test carried out on 30 December to ensure the gate valve is fully closed



Root Cause Analysis

1. The centrifuge was running in the early morning and theoretically only suspension from AD3 would transfer to the IDT during the process.
2. Process water was found inject to IDT during the centrifuge process
3. Likely a hold in the control sequence logic causes the flushing water keep injecting to IDT even the flushing process finished.
4. The team did aware the IDT tank was reaching high level however cannot immediately stop the flushing water injected to the IDT.
5. Process water with residual suspension overflowed from IDT to the overflow tank.
6. Process water with residual suspension overflowed to the surface channel at AD tank farm and discharged to the surface channel inside the AD tank farm.
7. The 3-way valve was closed at the time of the outbreak. Unfortunately the 3-way valve was not able to tight seal and some of the suspension passed through the valve and leaked to the nullah slowly.

Figure.6 Location map of the incident



Description of Corrective Actions ⁽¹⁾

1. Put sandbags at the discharge outlet to stop the leakage.
2. Arranged to clean up the suspension leaked to the nullah by a vacuum tanker truck.
3. Arranged to clean up the suspension at the surface channel near the IDT and inside AD tank farm.
4. Trouble shoot the centrifuge flushing control logic.

Description of Preventive Actions ⁽²⁾

1. To check and fully close the 3-way gate valve to prevent possible leakage to nullah.
2. To carry out dye test to check the 3-way valve is fully closed.
3. To keep close monitoring the IDT level for each process (centrifuge and flushing).
4. To carry out programme enhancement to avoid injection of flushing water to IDT that may due to any interruption of programme sequence/logic.

(1) The corrective actions have been closed on 28 December 2019.
(2) The preventive actions have been closed on 31 December 2019.

Annex J2

Investigation Report - January 2020

Investigation Report of CEMS Exceedances

Date	1 - 31 January 2020
Time	Continuous monitoring throughout January 2020
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Cogeneration Unit (CHP) Ammonia Stripping Plan (ASP)
Exceedance Description	<ol style="list-style-type: none"> Continuous monitoring was carried out at the CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version F) for CAPCS, CHP and ASP respectively. The concentration of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including: <ul style="list-style-type: none"> • NO_x and VOCs (including methane) in the CHP • Dust, NO_x, VOCs (including methane) and NH₃ in the ASP. According to the Contractor, the plant was receiving around 100 tonnes of SSOW daily and was operated normally. The Contractor explained that the exceedances recorded in the ASP was because the thermal combustion unit of the ASP still require tuning to optimise the combustion efficiency.
Action Taken / Action to be Taken	<ul style="list-style-type: none"> • It was arranged with the supplier of CHPs to check the performance of CHPs onsite during the reporting period. The supplier will conduct a detailed investigation of the remaining exceedance recorded on the CHPs. After the investigation, the Contractor will perform the maintenance work according to suggestions raised by the supplier. The maintenance work is expected to complete in the next reporting period. • Parts of the modification works on the ASP has been completed, with more components waiting to be delivered to Hong Kong. The Contractor has scheduled the remaining modification work for the next few reporting periods with schedule shutdown of the ASP to facilitate the installation of equipment for performance optimisation.
Remedial Works and Follow-up Actions	The Contractor is recommended to closely monitor the processes, including the modification work and follow-up emission monitoring of the ASP to avoid exceedance. MT will carry out follow-up audit regarding the progress next month.

OSCAR Bioenergy Joint Venture
EP/SP/61/10 – Organic Resources Recovery Centre Phase 1

Prepared by: Bonia Leung, MT Representative

Date 6 January 2020

Annex J3

Investigation Report - February 2020

Investigation Report of CEMS Exceedances

Date	1 - 29 February 2020
Time	Continuous monitoring throughout January 2020
Monitoring Location	Continuous Environmental Monitoring System (CEMS)
Parameter	Various emission parameters of the Cogeneration Unit (CHP) Ammonia Stripping Plan (ASP)
Exceedance Description	<ol style="list-style-type: none"> Continuous monitoring was carried out at the CHP and ASP throughout the reporting period using the CEMS. According to the EM&A Manual, exceedance is considered if the emission concentration of the concerned pollutants is higher than the emission limits stated in Tables 2.2, 2.3 and 2.5 of the EM&A Manual (Version F) for CAPCS, CHP and ASP respectively. The concentration of the concerned air pollutants were monitored on-line by the CEMS. Exceedances of various emission parameters were recorded on the CEMS including: <ul style="list-style-type: none"> NO_x, SO₂ and VOCs (including methane) in the CHP Carbon Monoxide, NO_x, SO₂, VOCs (including methane), NH₃ and HF in the ASP. According to the Contractor, the plant was receiving around 100 tonnes of SSOW daily and was operated normally. The Contractor explained that the exceedances recorded in the ASP was because the thermal combustion unit of the ASP still require tuning to optimise the combustion efficiency.
Action Taken / Action to be Taken	<ul style="list-style-type: none"> It was arranged with the supplier of CHPs to check the performance of CHPs onsite during the reporting period. However, the supplier could not travel to Hong Kong due to the restrictive travel arrangement during this reporting period. The supplier will conduct a detailed investigation of the remaining exceedance recorded on the CHPs. After the investigation, the Contractor will perform the maintenance work according to suggestions raised by the supplier. Parts of the modification works on the ASP has been completed, with more components waiting to be delivered to Hong Kong. The Contractor has scheduled the remaining modification work for the next few reporting periods with schedule shutdown of the ASP to facilitate the installation of equipment for performance optimisation.
Remedial Works and Follow-up Actions	The Contractor is recommended to closely monitor the processes, including the modification work and follow-up

	emission monitoring of the ASP to avoid exceedance. MT will carry out follow-up audit regarding the progress next month.
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Prepared by: Bonia Leung, MT Representative

Date 5 March 2020